



1

SEQUENCE LISTING

<110> KITAMURA, SATOSHI

<120> PLANT PIGMENT ACCUMULATION GENE

<130> 1975.1004

<140> 10/797,035

<141> 2004-03-11

<150> JP 2003-066310

<151> 2003-03-12

<160> 46

<170> PatentIn version 3.5

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aaaaaaccag aacatcttct tcgtcagcca tttgggtcaag ttccagccat agaagatgga      180
gatttcaagc tttttgaatc acgagccatc gcgagatact acgctaccaa gttcgcggac      240
caaggcacga accttttggg caagtctcta gagcaccgag ccatcgtgga ccagtgggct      300
gacgtggaga cctattactt caacgttctg gcccaacccc tcgtgattaa cctaatactc      360
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gaattcacta tggctgattt gacgcacatg ccggcgatgg ggtacttgat gagtataacc      540
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 20 25 30

Ile Asp Leu Asp Thr Phe Glu Gln Lys Lys Pro Glu His Leu Leu Arg
 35 40 45

Gln Pro Phe Gly Gln Val Pro Ala Ile Glu Asp Gly Asp Phe Lys Leu
 50 55 60

Phe Glu Ser Arg Ala Ile Ala Arg Tyr Tyr Ala Thr Lys Phe Ala Asp
 65 70 75 80

Gln Gly Thr Asn Leu Leu Gly Lys Ser Leu Glu His Arg Ala Ile Val
 85 90 95

Asp Gln Trp Ala Asp Val Glu Thr Tyr Tyr Phe Asn Val Leu Ala Gln
 100 105 110

Pro Leu Val Ile Asn Leu Ile Ile Lys Pro Arg Leu Gly Glu Lys Cys
 115 120 125

Asp Val Val Leu Val Glu Asp Leu Lys Val Lys Leu Gly Val Val Leu
 130 135 140

Asp Ile Tyr Asn Asn Arg Leu Ser Ser Asn Arg Phe Leu Ala Gly Glu
 145 150 155 160

Glu Phe Thr Met Ala Asp Leu Thr His Met Pro Ala Met Gly Tyr Leu
 165 170 175

Met Ser Ile Thr Asp Ile Asn Gln Met Val Lys Ala Arg Gly Ser Phe
 180 185 190

Asn Arg Trp Trp Glu Glu Ile Ser Asp Arg Pro Ser Trp Lys Lys Leu
 195 200 205

Met Val Leu Ala Gly His
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<220>
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<210> 4
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<220>
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<210> 5
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<210> 6
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 <400> 6
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<210> 7
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<220>
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<210> 8
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<210> 18
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<210> 19
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<400> 19
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<210> 20
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primer

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 <222> (11)..(11)
 <223> a, c, g or t

<400> 20
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<210> 21
 <211> 16
 <212> DNA
 <213> Artificial Sequence

<220>
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 <223> a, c, g or t

<220>
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 <223> a, c, g or t

<220>
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 <222> (13)..(13)
 <223> a, c, g or t

<400> 21
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<210> 22
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 <212> DNA
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 <223> a, c, g or t

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| <210> 23 | |
| <211> 30 | |
| <212> DNA | |
| <213> Artificial Sequence | |
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| <400> 23 | |
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| | |
| <210> 24 | |
| <211> 30 | |
| <212> DNA | |
| <213> Artificial Sequence | |
| <220> | |
| <223> Description of Artificial Sequence: Synthetic primer | |
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| <400> 24 | |
| ggttcttcag atcatcataa attggagcta | 30 |
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| <210> 25 | |
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| <212> DNA | |
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| <400> 25 | |
| atggctggtg cttcttcttt gg | 22 |
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| <210> 26 | |
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| tctctccgac agatgtgtca gg | 22 |

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<400> 29
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<400> 30
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<210> 31
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 <210> 33
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 <210> 34
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 <220>
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 <210> 35
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<210> 36
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<220>
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<400> 36
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<210> 37
 <211> 26
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<400> 37
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<210> 38
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<400> 38
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<210> 39
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 <212> PRT
 <213> Arabidopsis thaliana

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 20 25 30

Val Asp Leu Asp Lys Leu Glu Gln Lys Lys Pro Gln His Leu Leu Arg
 35 40 45

Gln Pro Phe Gly Gln Val Pro Ala Ile Glu Asp Gly Tyr Leu Lys Leu
50 55 60

Phe Glu Ser Arg Ala Ile Ala Arg Tyr Tyr Ala Thr Lys Tyr Ala Asp
65 70 75 80

Gln Gly Thr Asp Leu Leu Gly Lys Thr Leu Glu Gly Arg Ala Ile Val
85 90 95

Asp Gln Trp Val Glu Val Glu Asn Asn Tyr Phe Tyr Ala Val Ala Leu
100 105 110

Pro Leu Val Met Asn Val Val Phe Lys Pro Lys Ser Gly Lys Pro Cys
115 120 125

Asp Val Ala Leu Val Glu Glu Leu Lys Val Lys Phe Asp Lys Val Leu
130 135 140

Asp Val Tyr Glu Asn Arg Leu Ala Thr Asn Arg Tyr Leu Gly Gly Asp
145 150 155 160

Glu Phe Thr Leu Ala Asp Leu Ser His Met Pro Gly Met Arg Tyr Ile
165 170 175

Met Asn Glu Thr Ser Leu Ser Gly Leu Val Thr Ser Arg Glu Asn Leu
180 185 190

Asn Arg Trp Trp Asn Glu Ile Ser Ala Arg Pro Ala Trp Lys Lys Leu
195 200 205

Met Glu Leu Ala Ala Tyr
210

<210> 40
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<212> PRT
<213> Petunia sp.

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20 25 30

Val Asp Leu Asp Ser Leu Glu Gln Lys Lys Pro Glu Phe Leu Val Leu
 35 40 45

Gln Pro Phe Gly Gln Val Pro Val Ile Glu Asp Gly Asp Phe Arg Leu
 50 55 60

Phe Glu Ser Arg Ala Ile Ile Arg Tyr Tyr Ala Ala Lys Tyr Glu Val
 65 70 75 80

Lys Gly Ser Lys Leu Thr Gly Thr Thr Leu Glu Glu Lys Ala Leu Val
 85 90 95

Asp Gln Trp Leu Glu Val Glu Ser Asn Asn Tyr Asn Asp Leu Val Tyr
 100 105 110

Asn Met Val Leu Gln Leu Leu Val Phe Pro Lys Met Gly Gln Thr Ser
 115 120 125

Asp Leu Thr Leu Val Thr Lys Cys Ala Asn Lys Leu Glu Asn Val Phe
 130 135 140

Asp Ile Tyr Glu Gln Arg Leu Ser Lys Ser Lys Tyr Leu Ala Gly Glu
 145 150 155 160

Phe Phe Ser Leu Ala Asp Leu Ser His Leu Pro Ser Leu Arg Phe Leu
 165 170 175

Met Asn Glu Gly Gly Phe Ser His Leu Val Thr Lys Arg Lys Cys Leu
 180 185 190

His Glu Trp Tyr Leu Asp Ile Ser Ser Arg Asp Ser Trp Lys Lys Val
 195 200 205

Leu Asp Leu Met Met Lys Lys Ile Ser Glu Ile Glu Ala Val Ser Ile
 210 215 220

Pro Ala Lys Glu Glu Ala Lys Val
 225 230

<210> 41
 <211> 213
 <212> PRT
 <213> Nicotiana tabacum

<400> 41

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Val Ala Ala Cys Leu Ile Glu Lys Glu Leu Asp Phe Glu Phe Val Pro
 20 25 30

Val Asp Met Ala Ser Gly Glu His Lys Lys His Pro Tyr Leu Ser Leu
 35 40 45

Asn Pro Phe Gly Gln Val Pro Ala Phe Glu Asp Gly Asp Leu Lys Leu
 50 55 60

Phe Glu Ser Arg Ala Ile Thr Gln Tyr Ile Ala His Val Tyr Ala Asp
 65 70 75 80

Asn Gly Tyr Gln Leu Ile Leu Gln Asp Pro Lys Lys Met Pro Ser Met
 85 90 95

Ser Val Trp Met Glu Val Glu Gly Gln Lys Phe Glu Pro Pro Ala Thr
 100 105 110

Lys Leu Thr Trp Glu Leu Gly Ile Lys Pro Ile Ile Gly Met Thr Thr
 115 120 125

Asp Asp Ala Ala Val Lys Glu Ser Glu Ala Gln Leu Ser Lys Val Leu
 130 135 140

Asp Ile Tyr Glu Thr Gln Leu Ala Glu Ser Lys Tyr Leu Gly Gly Asp
 145 150 155 160

Ser Phe Thr Leu Val Asp Leu His His Ile Pro Asn Ile Tyr Tyr Leu
 165 170 175

Met Ser Ser Lys Val Lys Glu Val Phe Asp Ser Arg Pro Arg Val Ser
 180 185 190

Ala Trp Cys Ala Asp Ile Leu Ala Arg Pro Ala Trp Val Lys Gly Leu
 195 200 205

Glu Lys Leu Gln Lys
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<210> 42
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 <212> PRT
 <213> Zea mays

<400> 42

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Arg Val Ala Thr Val Leu Asn Glu Lys Gly Leu Asp Phe Glu Ile Val
 20 25 30

Pro Val Asp Leu Thr Thr Gly Ala His Lys Gln Pro Asp Phe Leu Ala
 35 40 45

Leu Asn Pro Phe Gly Gln Ile Pro Ala Leu Val Asp Gly Asp Glu Val
 50 55 60

Leu Phe Glu Ser Arg Ala Ile Asn Arg Tyr Ile Ala Ser Lys Tyr Ala
 65 70 75 80

Ser Glu Gly Thr Asp Leu Leu Pro Ala Thr Ala Ser Ala Ala Lys Leu
 85 90 95

Glu Val Trp Leu Glu Val Glu Ser His His Phe His Pro Asn Ala Ser
 100 105 110

Pro Leu Val Phe Gln Leu Leu Val Arg Pro Leu Leu Gly Gly Ala Pro
 115 120 125

Asp Ala Ala Val Val Glu Lys His Ala Glu Gln Leu Ala Lys Val Leu
 130 135 140

Asp Val Tyr Glu Ala His Leu Ala Arg Asn Lys Tyr Leu Ala Gly Asp
 145 150 155 160

Glu Phe Thr Leu Ala Asp Ala Asn His Ala Leu Leu Pro Ala Leu Thr
 165 170 175

Ser Ala Arg Pro Pro Arg Pro Gly Cys Val Ala Ala Arg Pro His Val
 180 185 190

Lys Ala Trp Trp Glu Ala Ile Ala Ala Arg Pro Ala Phe Gln Lys Thr
 195 200 205

Val Ala Ala Ile Pro Leu Pro Pro Pro Pro Ser Ser Ser Ala
 210 215 220

<210> 43
 <211> 214
 <212> PRT
 <213> Zea mays

<400> 43
 Met Ala Pro Met Lys Leu Tyr Gly Ala Val Met Ser Trp Asn Leu Thr
 1 5 10 15

Arg Cys Ala Thr Ala Leu Glu Glu Ala Gly Ser Asp Tyr Glu Ile Val
 20 25 30

Pro Ile Asn Phe Ala Thr Ala Glu His Lys Ser Pro Glu His Leu Val
 35 40 45

Arg Asn Pro Phe Gly Gln Val Pro Ala Leu Gln Asp Gly Asp Leu Tyr
 50 55 60

Leu Phe Glu Ser Arg Ala Ile Cys Lys Tyr Ala Ala Arg Lys Asn Lys
 65 70 75 80

Pro Glu Leu Leu Arg Glu Gly Asn Leu Glu Glu Ala Ala Met Val Asp
 85 90 95

Val Trp Ile Glu Val Glu Ala Asn Gln Tyr Thr Ala Ala Leu Asn Pro
 100 105 110

Ile Leu Phe Gln Val Leu Ile Ser Pro Met Leu Gly Gly Thr Thr Asp
 115 120 125

Gln Lys Val Val Asp Glu Asn Leu Glu Lys Leu Lys Lys Val Leu Glu
 130 135 140

Val Tyr Glu Ala Arg Leu Thr Lys Cys Lys Tyr Leu Ala Gly Asp Phe
 145 150 155 160

Leu Ser Leu Ala Asp Leu Asn His Val Ser Val Thr Leu Cys Leu Phe
 165 170 175

Ala Thr Pro Tyr Ala Ser Val Leu Asp Ala Tyr Pro His Val Lys Ala
 180 185 190

Trp Trp Ser Gly Leu Met Glu Arg Pro Ser Val Gln Lys Val Ala Ala
 195 200 205

Leu Met Lys Pro Ser Ala
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<210> 44
 <211> 223
 <212> PRT
 <213> Zea mays

<400> 44
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Val Ser Arg Ala Leu Leu Ala Leu Glu Glu Ala Gly Val Asp Tyr Glu
 20 25 30

Leu Val Pro Met Ser Arg Gln Asp Gly Asp His Arg Arg Pro Glu His
 35 40 45

Leu Ala Arg Asn Pro Phe Gly Lys Val Pro Val Leu Glu Asp Gly Asp
 50 55 60

Leu Thr Leu Phe Glu Ser Arg Ala Ile Ala Arg His Val Leu Arg Lys
 65 70 75 80

His Lys Pro Glu Leu Leu Gly Gly Gly Arg Leu Glu Gln Thr Ala Met
 85 90 95

Val Asp Val Trp Leu Glu Val Glu Ala His Gln Leu Ser Pro Pro Ala
 100 105 110

Ile Ala Ile Val Val Glu Cys Val Phe Ala Pro Phe Leu Gly Arg Glu
 115 120 125

Arg Asn Gln Ala Val Val Asp Glu Asn Val Glu Lys Leu Lys Lys Val
 130 135 140

Leu Glu Val Tyr Glu Ala Arg Leu Ala Thr Cys Thr Tyr Leu Ala Gly
 145 150 155 160

Asp Phe Leu Ser Leu Ala Asp Leu Ser Pro Phe Thr Ile Met His Cys
 165 170 175

Leu Met Ala Thr Glu Tyr Ala Ala Leu Val His Ala Leu Pro His Val
 180 185 190

Ser Ala Trp Trp Gln Gly Leu Ala Ala Arg Pro Ala Ala Asn Lys Val
 195 200 205

Ala Gln Phe Met Pro Val Gly Ala Gly Ala Pro Lys Glu Gln Glu
 210 215 220

<210> 45

<211> 229

<212> PRT

<213> Triticum sp.

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Met Ser Pro Val Lys Val Phe Gly His Pro Met Leu Thr Asn Val Ala
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Arg Val Leu Leu Phe Leu Glu Glu Val Gly Ala Glu Tyr Glu Leu Val
 20 25 30

Pro Met Asp Phe Val Ala Gly Glu His Lys Arg Pro Gln His Val Gln
 35 40 45

Leu Asn Pro Phe Ala Lys Met Pro Gly Phe Gln Asp Gly Asp Leu Val
 50 55 60

Leu Phe Glu Ser Arg Ala Ile Ala Lys Tyr Ile Leu Arg Lys Tyr Gly
 65 70 75 80

Gly Thr Ala Gly Leu Asp Leu Leu Gly Glu Asn Ser Gly Ile Glu Glu
 85 90 95

Leu Ala Met Val Asp Val Trp Thr Glu Val Glu Ala Gln Gln Tyr Tyr
 100 105 110

Pro Ala Ile Ser Pro Val Val Phe Glu Cys Ile Ile Ile Pro Phe Ile
 115 120 125

Ile Pro Gly Gly Gly Ala Ala Pro Asn Gln Thr Val Val Asp Glu Ser
 130 135 140

Leu Glu Arg Leu Arg Gly Val Leu Gly Ile Tyr Glu Ala Arg Leu Glu
 145 150 155 160

Lys Ser Arg Tyr Leu Ala Gly Asp Ser Ile Thr Phe Ala Asp Leu Asn
 165 170 175

His Ile Pro Phe Thr Phe Tyr Phe Met Thr Thr Pro Tyr Ala Lys Val
 180 185 190

Phe Asp Asp Tyr Pro Lys Val Lys Ala Trp Trp Glu Met Leu Met Ala
 195 200 205

Arg Pro Ala Val Gln Arg Val Cys Lys His Met Pro Thr Glu Phe Lys
 210 215 220

Leu Gly Ala Gln Tyr
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<210> 46
 <211> 236
 <212> PRT
 <213> Zea mays

<400> 46
 Met Arg Val Leu Gly Gly Glu Val Ser Pro Phe Thr Ala Arg Ala Arg
 1 5 10 15

Leu Ala Leu Asp Leu Arg Gly Val Ala Tyr Glu Leu Leu Asp Glu Pro
 20 25 30

Leu Gly Pro Lys Lys Ser Asp Arg Leu Leu Ala Ala Asn Pro Val Tyr
 35 40 45

Gly Lys Ile Pro Val Leu Leu Leu Pro Asp Gly Arg Ala Ile Cys Glu
 50 55 60

Ser Ala Val Ile Val Gln Tyr Ile Glu Asp Val Ala Arg Glu Ser Gly
 65 70 75 80

Gly Ala Glu Ala Gly Ser Leu Leu Leu Pro Asp Asp Pro Tyr Glu Arg
 85 90 95

Ala Met His Arg Phe Trp Thr Ala Phe Ile Asp Asp Lys Phe Trp Pro
 100 105 110

Ala Leu Asp Ala Val Ser Leu Ala Pro Thr Pro Gly Ala Arg Ala Gln
 115 120 125

Ala Ala Glu Asp Thr Arg Ala Ala Leu Ser Leu Leu Glu Glu Ala Phe
 130 135 140

Lys Asp Arg Ser Asn Gly Arg Ala Phe Phe Ser Gly Gly Asp Ala Ala
 145 150 155 160

Pro Gly Leu Leu Asp Leu Ala Leu Gly Cys Phe Leu Pro Ala Leu Arg
 165 170 175

Ala Cys Glu Arg Leu His Gly Leu Ser Leu Ile Asp Ala Ser Ala Thr
 180 185 190

Pro Leu Leu Asp Gly Trp Ser Gln Arg Phe Ala Ala His Pro Ala Ala
 195 200 205

Lys Arg Val Leu Pro Asp Thr Glu Lys Val Val Gln Phe Thr Arg Phe
 210 215 220

Leu Gln Val Gln Ala Gln Phe Arg Val His Val Ser
 225 230 235